

R E M A R K S

Reconsideration of this application, as amended, is respectfully requested.

THE CLAIMS

Claim 1 has been amended to correct some minor antecedent basis problems, and claim 2 has been amended to better depend from claim 1.

Claims 3 and 5-72, moreover, have all been canceled, without prejudice.

No new matter has been added, and it is respectfully requested that the amendments to the claims be approved and entered.

It is respectfully submitted, moreover, that the amendments to the claims are not related to patentability, and do not narrow the scope of the claims either literally or under the doctrine of equivalents.

THE PRIOR ART REJECTION

Claims 1, 2 and 4 were rejected under 35 USC 102 as being anticipated by or, in the alternative, under 35 USC 103 as being obvious over USP 601,966 ("Ivins"). These rejections, however, are respectfully traversed.

It is respectfully submitted that the pipe produced by the process of the present invention as recited in claim 1 has a unique construction which results in unobvious differences as compared to prior art pipes such as the pipe manufactured according to the process disclosed in Ivins. One significant difference relates to the dimensional accuracy of the pipe, i.e., the uniformity of its dimensions in an axial direction. This and other differences arise from differences in the process by which the pipes in accordance with the claimed present invention is manufactured and the process by which the pipe in accordance with Ivins is manufactured.

According to the present invention as recited in claim 1, a high dimensional accuracy pipe is manufactured by a push-to-pass process comprising pushing at least one metal pipe in a hole provided in a die while a plug is being charged in the metal pipe, and allowing the metal pipe to pass through the hole. As recited in claim 1, at least one of a deviation of a outside diameter, a deviation of an inside diameter, and a deviation of a thickness in the circumferential direction of the pipe as processed is 3% or less.

By manufacturing a pipe using a push-to-pass process in which the pipe is pushed into a hole in a die, compressive force works entirely in the die (see Fig. 1 wherein the pushing force

is represented by arrow 11 and the compressive force is present in the area of the compressive stress). As a result, as shown in Fig. 1, at the inlet and outlet sides of the die 2, the pipe 4 contacts the plug 1 and die 2 along its entire circumference. In addition, at a small diameter reduction rate, since compressive strength is generated inside the die 2, contact between the pipe 4 and the plug 1 and between the pipe 4 and the die 2 is made along the entire circumference. Therefore, the pipe 4 is likely to be smoothed as it passes through the hole in the die 2, and a high dimensional accuracy pipe 4 can be obtained with a high degree of smoothness and uniformity of its dimensions.

Ivins, by contrast, discloses a seamless metal pipe which is drawn out using a die and a plug, whereby the plug is inserted into a tube and the tube and plug are drawn or pulled through the die. For such a drawn metal pipe, it has been difficult to improve the dimensional accuracy since the drawing or pulling force works as a tensile force so that there is insufficient contact between the die and the exterior surface of the pipe and between the plug and the interior surface of the pipe to ensure that the drawn metal pipe is smooth.

The effect of the metal pipe drawing process of Ivins is illustrated in Fig. 2 of the present application, and notwithstanding differences in the shape of the plug and the die,

the effect of the metal pipe drawing process will be the same. As shown in Fig. 2, when a plug 5 is charged in a pipe 4, and the pipe 4 is drawn out through a hole provided in a die 6, by a drawing force 10 applied at an outlet side of the die 6, tensile stress is generated inside the die 6. As a result, surface irregularities are generated on the pipe 4 and increase on the interior and exterior surfaces of the pipe in a direction from an inlet side to an outlet side of the die 6. In addition, at the inlet side of the die 6, since the interior surface of the pipe 4 is deformed along the plug 5, contact of the exterior surface of the pipe 4 is not substantially made or is only slightly made. At the outlet side of the die 6, since the exterior surface of the pipe 4 contacts the die 6 and is deformed, contact of the interior surface of the pipe is not substantially made or is only slightly made. Therefore, on both the interior and exterior surfaces of the pipe 4, since portions which can be freely deformed are present, irregularities cannot be sufficiently smoothed, and as a result, the dimensional accuracy of the pipe obtained by drawing is extremely low.

Accordingly, as a result of the different locations from which force is applied during the pipe formation process, i.e., from a location after the die in the metal pipe drawing process of Ivins or from a location before the die in the metal pipe

push-to-pass process according to the claimed present invention, the dimensional accuracy and smoothness of a pipe produced by the process of claim 1 are significantly higher than the dimensional accuracy and smoothness of a pipe produced by the drawing process of Ivins. And these differences enable pipes produced by the process of the claimed present invention to exhibit significantly improved properties during use, which cannot be realized by pipes produced by a drawing process as disclosed in Ivins.

It is respectfully submitted, moreover, that when the fatigue strength of pipes produced by the push-to-pass process set forth in claim 1 is compared to pipes produced by a drawing process as in Ivins, the pipes manufactured by the push-to-pass process in accordance with the claimed present invention are able to obtain a targeted sufficient fatigue strength whereas pipes produced by drawing processes cannot. Further, the push-to-pass process in accordance with the claimed present invention results in pipes which experience less strain when performing smoothing of the interior and exterior surfaces at small diameter reduction rates, as compared to pipes produced by a drawing process as in Ivins, so that a heat treatment load after the diameter reduction is small and manufacturing cost can also be decreased.

In sum, it is respectfully submitted that the applicant has satisfied the burden of showing at least one unobvious difference

between pipes produced by the process set forth in claim 1 and pipes produced by the process disclosed in Ivins, i.e., a general pipe drawing process, and that as a result, the pipes produced by the process as according to the claimed present invention are not the same as or similar to those produced by the process disclosed in Ivins.

Accordingly, it is respectfully submitted that the present invention as recited in independent claim 1 and claims 2 and 4 depending therefrom clearly patentably distinguish over Ivins under 35 USC 102 as well as under 35 USC 103.

INFORMATION DISCLOSURE STATEMENT

The Examiner stated that the Information Disclosure Statement submitted on July 13, 2005 did not comply with 37 CFR 1.98(a)(3) because it did not include a concise explanation of the relevance of the foreign-language references and therefore the Examiner did not consider the references.

It is respectfully pointed out, however, that all of the foreign-language references were cited in the International Search Report for the corresponding, priority International Application, and that since the International Search Report is in the English-language, it constitutes a concise explanation of the relevance of the foreign-language references. Therefore, it is

respectfully requested that the foreign-language references be considered in light of the concise explanation of the relevance thereof as provided by the International Search Report.

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In view of the foregoing, entry of this Amendment, allowance of the claims and the passing of this application to issue are respectfully solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,

/Douglas Holtz/

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